Cruzane Mountain Project

Environmental Analysis - Fisheries Report and Biological Evaluation

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Introduction

The Cruzane Mountain project is located within portions of two watersheds (HUC12 – 6th level), Packer Creek and Upper Saint Regis River. The southern boundary of the project area borders the St. Regis River. Two substantial streams (and their tributaries) which flow into the St. Regis River, Packer Creek (western boundary of project area) and McManus Creek (eastern boundary of the project area), encompass most of the project's drainage area. Additionally, a small portion of the Timber Creek drainage is present within the easternmost extent of the project area.

This aquatics effects report for the Cruzane Mountain Project is designed to meet the objectives of (1) disclosing environmental effects to the public, project stakeholders, and decision makers according to the National Environmental Policy Act (NEPA); (2) to provide a biological evaluation (i.e. species population viability assessment) in compliance with National Forest Management Act; and (3) to determine the level of Section 7 Consultation required with the Fish and Wildlife Service for federally listed bull trout and designated bull trout critical habitat.

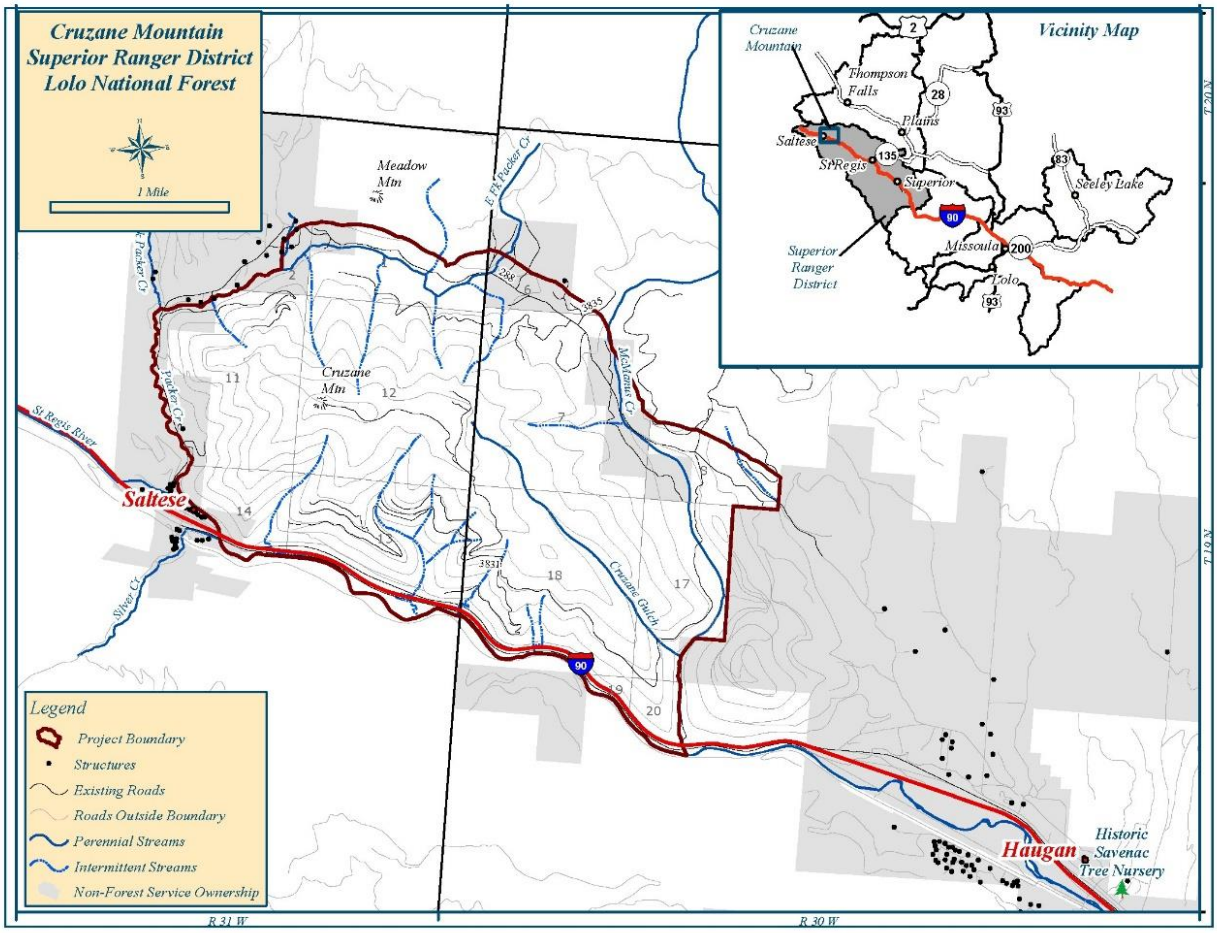

Figure 1. Project area overview.

Project Action Summary

The Forest Service is proposing to use commercial and non-commercial forest management activities, as well as prescribed ecosystem management burns and hand fuel treatments to meet the needs within the project area. Other activities, such as road management, would also be implemented to support transporting forest products or address resource concerns. Treatment summaries are provided in the analysis section; see Cruzane Mountain Project Environmental Assessment for detailed descriptions of all proposed activities.

Species Summary

The following table displays the species considered for analysis, as well as a summary of effects and determination statements. Special status species located within the Lolo National Forest, and potentially within or near the project area, were obtained from the Region 1 special status species website (https://www.fs.usda.gov/detail/r1/plants-animals/?cid=stelprdb5130525). The lists for federally listed aquatic species (2010) and U.S. Forest Service sensitive species Regional Forester's list (2011). In addition, a reference IpaC list was downloaded from the U.S. Fish and Wildlife Service website (https://ecos.fws.gov/ipac/location/index) on January 2nd, 2020; bull trout were the only federally listed aquatic species present on the list.

Table 1. Aquatic species summary and determinations.

Species	Status*	Determination**	Rationale
Included in Analysis			
Bull Trout (*Salvelinus confluentus*)	**T** **CH**	***NLAA*** ***No Effect***	Bull trout are presumed absent from the project area, with the nearest potential recent population located more than 10 miles downstream (Ward Creek vicinity) of the project area. Suitable habitat may be present in portions of some project streams (e.g., Packer and McManus Creeks), while other streams are likely unsuitable (e.g., St. Regis River) due to high temperature and fine sediment loading. Because some streams may contain suitable habitat, species absence cannot be absolutely assumed into the foreseeable future. No bull trout designated critical habitat is located within or near (9 miles) the project area. See westslope cutthroat trout for potential minor habitat effects that area also relevant for bull trout potentially suitable habitat. Short-term effects to habitat indicators (e.g., sediment) are possible in currently unoccupied habitat, with no measurable effects expected to reach critical habitat or occupied streams (vicinity of Ward and Twelvemile Creek). Models indicate a long-term reduction in sediment input due to improvements to road network, and no measurable temperature effects are expected.
Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)	**S**	***MIIH***	Westslope cutthroat trout are present within many project streams, including Packer and McManus Creeks and their tributaries; some of these populations are thought to be

Species	Status*	Determination**	Rationale
			genetically unaltered, while others are likely cutthroat-rainbow trout hybrids. Short-term effects to habitat indicators (e.g., sediment) are expected in currently occupied habitat, particularly immediately adjacent to, and downstream of, road work. The magnitude of these effects is unlikely to measurably effect cutthroat trout populations due to implementation of habitat protecting Resource Protection Measures and Best Management Practices. Modeling indicates a long-term reduction in sediment input due to road decommissioning and improvements to drainage characteristics of the road network. Other potential effects, such as water temperature change, are not expected to be measurable at analysis scales (small watershed) due to the lack of project treatment within occupied waters, and restrictions/requirements on activities within riparian areas that are expected to adequately protect all habitat indicators.
No Detailed Analysis – Excluded Based on Proximity			
Western Pearlshell Mussel (*Margaritifera falcata*)	**S**	***No Effect***	This species is not known to occur within the St. Regis River watershed; therefore, it is assumed absent and would not be affected.

***Status abbreviations:**

T = USFWS/NMFS federally threatened, CH = Critical Habitat present

S = U.S. Forest Service sensitive

****Determination acronyms:**

NLAA = May Affect, but Not Likely to Adversely Affect

MIIH = May impact individuals or habitat but will not likely result in a trend toward federal listing or reduced viability for the population or species.

METHODS

Objective 1: Aquatic ecosystem indicators to be analyzed have been modeled after the Inland Native Fish Strategy (INFISH) riparian management objectives (RMOs). These indicators are Pool Frequency, Water Temperature, Large Woody Debris, and Width/Depth Ratio (U.S. Department of Agriculture 1995 and Pacific Northwest Regions.). Although sediment has been documented as a primary cause of stream degradation, measuring the direct effect of project-related sediment apart from background sediment sources is notoriously difficult; INFISH therefore does not include sediment as a RMO. However, INFISH riparian habitat conservation area (RHCA) buffer distances were designed to filter non-point sediment from runoff before reaching streams (USDA 1995; (Belt, O'Laugblin and Merrill 1992 J., and Merrill, T. 1992. Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature. Report No.8)). Furthermore, best management practices (BMPs) will be applied to all project units and roads, as they have been shown to mitigate point-source sediment delivery to aquatic systems (U.S. Department of Agriculture). This analysis will use both 1) RHCA exclusion zones and BMP assumed effectiveness, and 2) results from sediment modeling (WEPP, GRAIP Lite) to estimate the magnitude of effects to the sediment indicator. Physical Barriers are not addressed by INFISH but will be included as an indicator since project related road construction and maintenance has the potential to affect barriers.

In order to determine if the Cruzane Mountain Project will have a substantial effect on aquatic resources it is first necessary to define a threshold by which the duration and intensity of effects are evaluated. The effects threshold for this report is based on Lolo National Forest Plan standards (U.S. Department of Agriculture 1986 MT.):

Standard 24: "All threatened and endangered species occurring on the Lolo including the grizzly bear, bald eagle, peregrine falcon, and gray wolf will be managed for recovery to non-threatened status."

Standard 27: "…for plant and animal species that are not threatened or endangered, but where viability is a concern (i.e., sensitive species), manage to maintain population viability…"

Standard 28: "Land management practices shall be designed to have a minimum impact on the aquatic ecosystem, free from permanent or long-term unnatural imposed stress. (A long-term stress is defined as a downward trend of indicators such as aquatic insect density or diversity, fish populations, intragravel sediment accumulations, or channel structure changes that continue for more than 1 hydrologic year…"

The resulting effects threshold for aquatic resources is therefore defined as:

"Any effects from Cruzane Mountain actions that impedes listed species recovery, threatens the viability of aquatic species, or imposes a downward trend on the aquatic ecosystem indicators (i.e. pool frequency, water temperature, large woody debris, width/depth ratio, sediment, physical barriers)."

Objective 2: Aquatic organism presence/absence data from Montana Fish Wildlife and Parks (MFWP) and the Lolo National Forest (Lolo) will be presented to determine which species have the potential to be affected by project actions. The biological evaluation will consist of how effects to aquatic ecosystem indicators (Objective 1) may affect the population viability of all aquatic species according to Forest Service Manual direction (FSM 2672.40). Final viability assessments are conducted according to principles established in "Consideration of Extinction Risks for Salmonids" ((Rieman et al. 1993 J. McIntyre, K. Overton, and R. Thurow. 1993. Consideration of extinction risks for salmonids. USDA Forest Service, Intermountain Research Station, Work Unit 4203, Boise, Idaho.)).

Objective 3: Results of objectives 1 and 2 are summarized at the conclusion of this report to recommend the appropriate level of Section 7 consultation required by the Endangered Species Act (ESA).

MODELING

The WEPP Disturbance Model was used to quantify potential sediment production and delivery from project units. The GRAIP Lite model was used to evaluate sediment production and delivery from roads (existing and project). See hydrology report for a more detailed discussion on WEPP and GRAIP Lite modeling.

DATA SOURCES

Pool Frequency, Large Woody Debris, Width/Depth Ratio, and Sediment data were recorded at three PACFISH/INFISH Biological Opinion (PIBO) monitoring stations on the St. Regis River and East Fork Packer Creek (Monitoring Resources 2018). Water Temperature data was sourced from the NorWeST database operated by the Rocky Mountain Research Station which includes water temperature data collected by various

agencies (RMRS; {United States Department of Agriculture (USDA) Forest Service. 2018. Regional Database and Modeled Stream Temperatures. United States Department of Agriculture, Rocky Mountain Research Station. Accessed online December 2018: https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=bf3ff38068964700a1f278eb9a940dce)}). Physical Barrier data was obtained from Lolo National Forest culvert inventories and site visits for the Cruzane Project.

Aquatic organism presence/absence and distribution data was obtained from the Montana Fish, Wildlife, and Parks (MTFWP) and Forest Service (FS) electrofishing reports (see project file, unpublished data 2000-2014). Additional bull trout presence/absence data was obtained from the Rangewide Bull Trout eDNA Project database operated by RMRS ({United States Department of Agriculture (USDA) Forest Service. 2019. The Rangewide Bull Trout eDNA Project. United States Department of Agriculture, Rocky Mountain Research Station. Accessed online December 2019: https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=6d5597b2755c4c00a35613b7a1849760}). Western pearlshell mussel distribution data was obtained from the "Re-evaluation and trend analysis of western pearlshell mussel (SWG tier 1) populations across watersheds of western Montana" publication issued by the Montana Natural Heritage Program (MNHP) for MFWP ((Stagliano 2015)).

ANALYSIS BOUNDARY

Spatial: All treatment units and roads related to the Cruzane Project area are located with two 6th level hydrologic unit codes (HUC 12) watersheds, Packer Creek and Upper Saint Regis River; this total area is considered the project analysis boundary for aquatic species. This area includes approximately 3.5 miles of the St. Regis River downstream of the project area, which is sufficient to capture any project-related offsite effects (e.g., fine sediment).

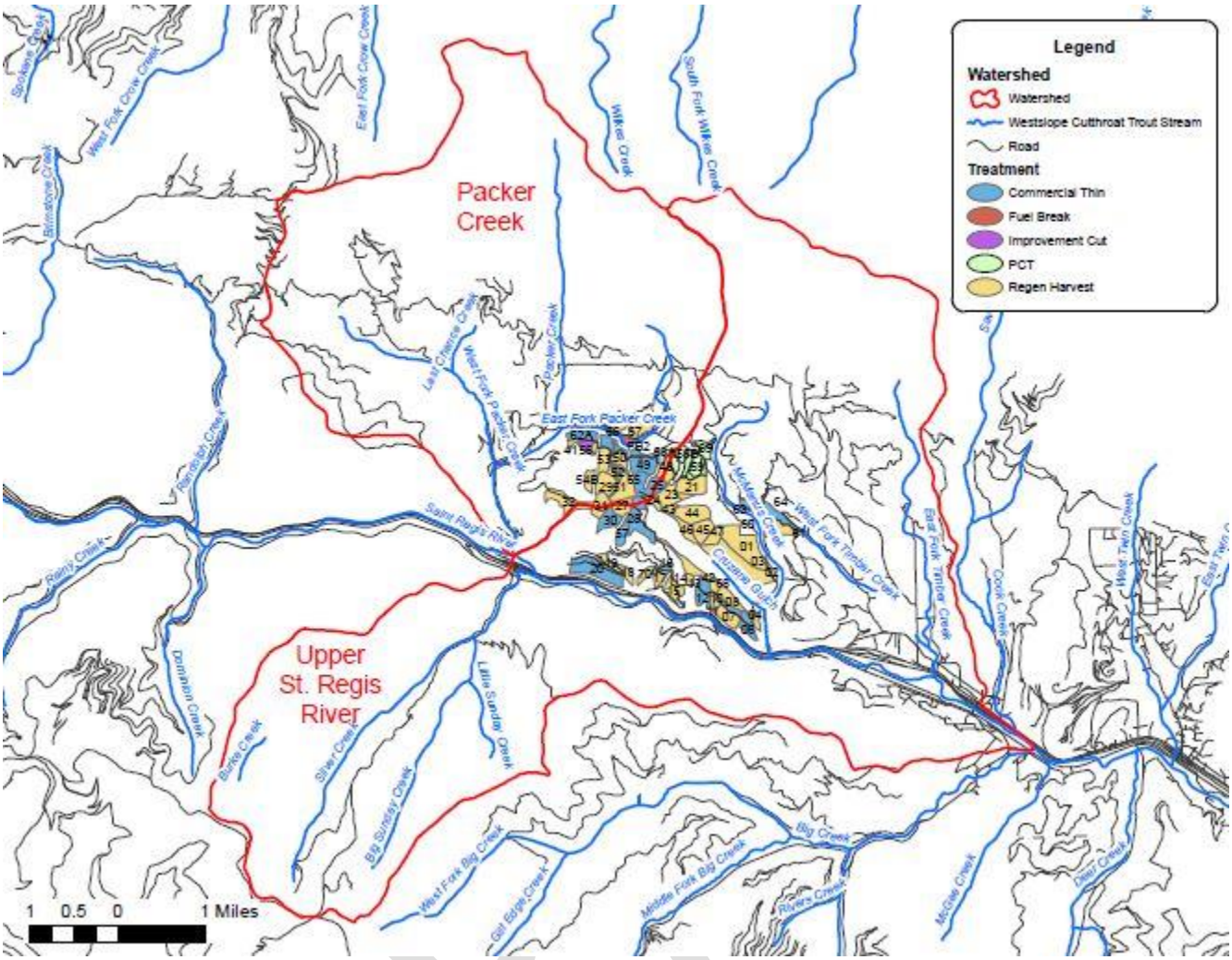

Figure 2. Analysis area sub-watersheds; Packer Creek and Upper St. Regis River.

Temporal: Largest effects are likely to occur during and shortly after initial road maintenance/construction, mechanical treatment within vegetation units, and managed fire implementation. The first few substantial precipitation events post-project may produce peak effects, which would likely occur within the first year or two post-disturbance. Lower magnitude effects may occur for years post-project, diminishing as disturbed areas recover. Roads may continue to contribute effects indefinitely, relying on periodic maintenance to minimize these effects. Therefore, this analysis considers short-term effects to occur within 2 years post-implementation, and long-term effects estimated at 20 years (vegetation recovery).

REGULATORY COMPILANCE

Environmental analyses found in this report were conducted in accordance with all legal and policy direction. Regulatory documents considered include:

- 1969 National Environmental Policy Act
- 1972 Clean Water Act
- 1973 Endangered Species Act
- 1976 National Forest Management Act
- 1986 Lolo National Forest Plan as amended by Inland Native Fish Strategy (1995)

- 1998 Bull Trout Threatened Status Ruling
- 2005 Council of Environmental Quality Regulations (reprint)
- 2005 Forest Service Manual on Sensitive Species
- 2010 Bull Trout Critical Habitat Designation
- 2012 Forest Service Handbook on NEPA Implementation
- 2013 Forest Service Bull Trout Conservation Strategy
- 2015 Coterminous United States Bull Trout Recovery Plan

AFFECTED ENVIRONMENT

Streams in the Cruzane Mountain project boundary generally flow from north to south, terminating in the St. Regis River, which approximates the southern boundary of the project area. Packer Creek and McManus Creek, and their tributaries, represent the majority of the project's drainage area. Historically, water quantity/quality and ample vegetation in the upper St. Regis River and its tributaries created prime spawning habitat for native aquatic species ((USDA-USFWS)). However, these natural conditions have been dramatically degraded by land use practices and large fires.

Primary land use disturbances in the St. Regis watershed stem from use as a corridor between Montana and Idaho. Disturbance of the mainstem St. Regis River began in the early 1900's with construction of two railroad lines that were subsequently followed by the I-90 interstate and utility lines. St. Regis tributaries were then subject to extensive logging operations and associated road networks. The degradation to fisheries that was caused by these activities was substantial; river/stream channels have been straightened, banks destabilized, habitat eliminated, and sediment loads elevated ((USDA-USFWS)).

Project-area streams are similar both in terms of geography/climate and past land use such that it is reasonable to extrapolate current indicator conditions from a subsample of survey points to the larger project area. Relevant to the Cruzane Mountain project area, indicator data has been collected at two long-term monitoring sites: mainstem St. Regis River and East Fork Packer Creek (Monitoring Resources 2018). All sites are located on Forest Service ownership along Forest System roads so that the PIBO data is generally representative of project area conditions.

Pool Frequency: This indicator is derived from counting the number of pools within a survey reach (approx. 150 – 300 m) and standardizing to 1 kilometer. INFISH states different pool frequencies for different size systems, with ~ 60/km for streams 10 feet wide, and ~ 35/km for streams 20 feet wide. PIBO survey results are presented in the figure below with dotted colored lines representing indicator trends from 2001 - 2016. The St. Regis (blue line) is substantially below INFISH target levels for 20' wide systems (INFISH River Target; large black dashed line) with a neutral trend line. East Fork Packer Creek is above INFISH target levels for 10' wide systems and with an improving trend line (i.e. more pools).

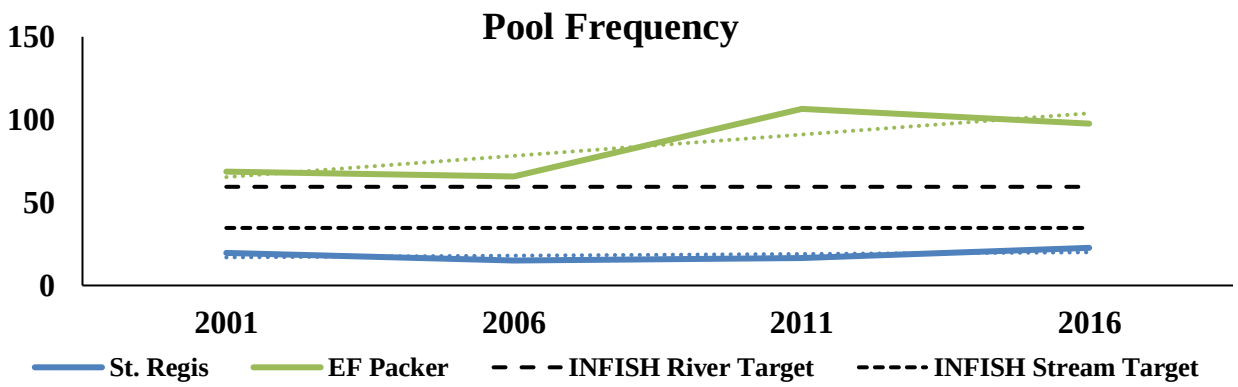

Figure 3. Pool Frequency results from PIBO sites within/near project area.

Width/Depth Ratio: This indicator is the average ratio of wetted width-to-depth ratio from four channel cross-sections. Cross-sections were measured at the widest location (i.e. bankfull width) in the first 4 riffles within straight stream segments. The INFISH target for this indicator is <10 for all systems. PIBO survey results are presented in the figure below with dotted colored lines representing indicator trends from 2001 - 2016. Project-area systems are above the INFISH target level (black dashed line); both St. Regis and East Fork Packer show improving trend lines (i.e. ratio is getting smaller).

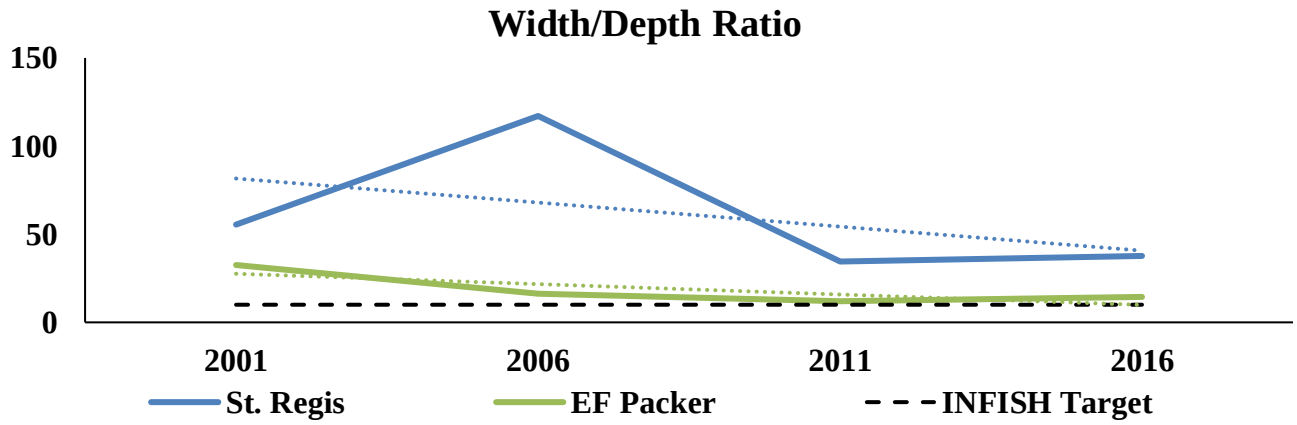

Figure 4. Width/Depth ratio results from PIBO sites within/near the project area.

Large Woody Debris: PIBO surveys record this indicator by counting the number of sticks/logs that are at least 1 meter long and 0.1 meters in diameter that have some portion within the stream channel. However, the INFISH target expressed in terms of requiring at least 12 pieces of wood that are at least 35 feet long and 1 foot in diameter. To address this measurement discrepancy, this report multiplied the INFISH target by 20 to match the correct order of magnitude as the PIBO survey values. This method does not allow for direct comparison, but retains the trend information such that the status of large wood can still be extrapolated to the Cruzane Mountain project area. Results are presented in the figure below with dotted colored lines representing indicator trends from 2001 - 2016. The St. Regis River and EF Packer Creek both show a downward trend (less woody debris) in recent years, though the overall trend for the St. Regis River is slightly upward.

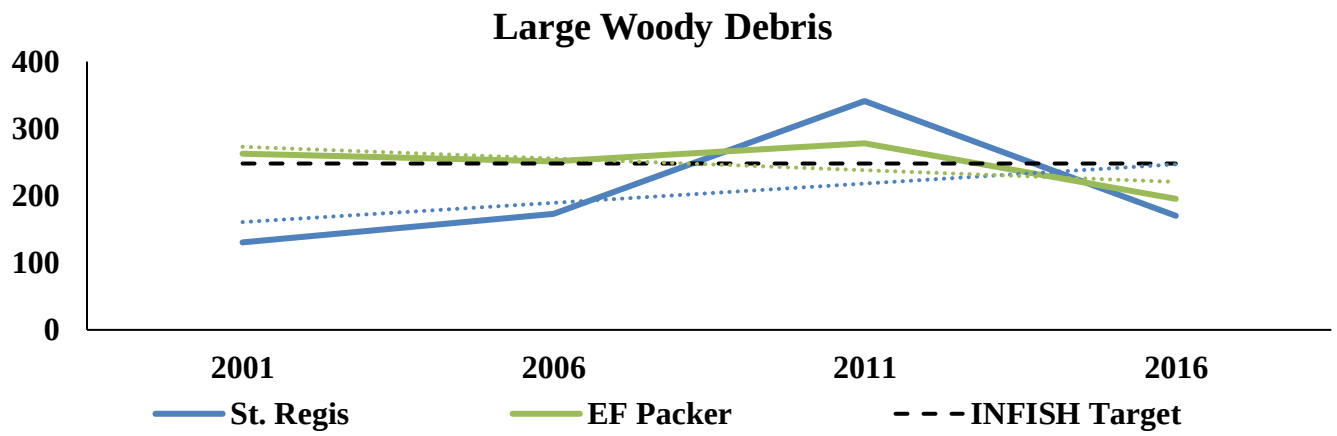

Figure 5. Large Woody Debris results from PIBO sites within/near project area.

Temperature: The temperature indicator is assessed via NorWeST temperature modeling. This is a product of the Rocky Mountain Research Station that utilizes a database created by "compiling temperature readings from hundreds of biologists and hydrologists working for >100 resource agencies and contains >200,000,000 hourly temperature recordings at >20,000 unique stream sites" ({United States Department of Agriculture (USDA) Forest Service. 2018. Regional Database and Modeled Stream Temperatures. United States Department of Agriculture, Rocky Mountain Research Station. Accessed online December 2018: https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=bf3ff38068964700a1f278eb9a940dce}). INFISH target specifies no measurable increases in maximum temperature. The figures below model output for current stream temperature conditions and modeled predictions for stream temperatures in the year 2040. Color coding is based on suitability for bull trout where shades of blue are ideal, green/yellow are likely stress-inducing, and mortality likely occurring at orange/red. Color differences between current and future stream temperatures suggest project-area streams may increase approximately 1-2 degrees Celsius over the next 20 years (i.e. trending towards thermal degradation).

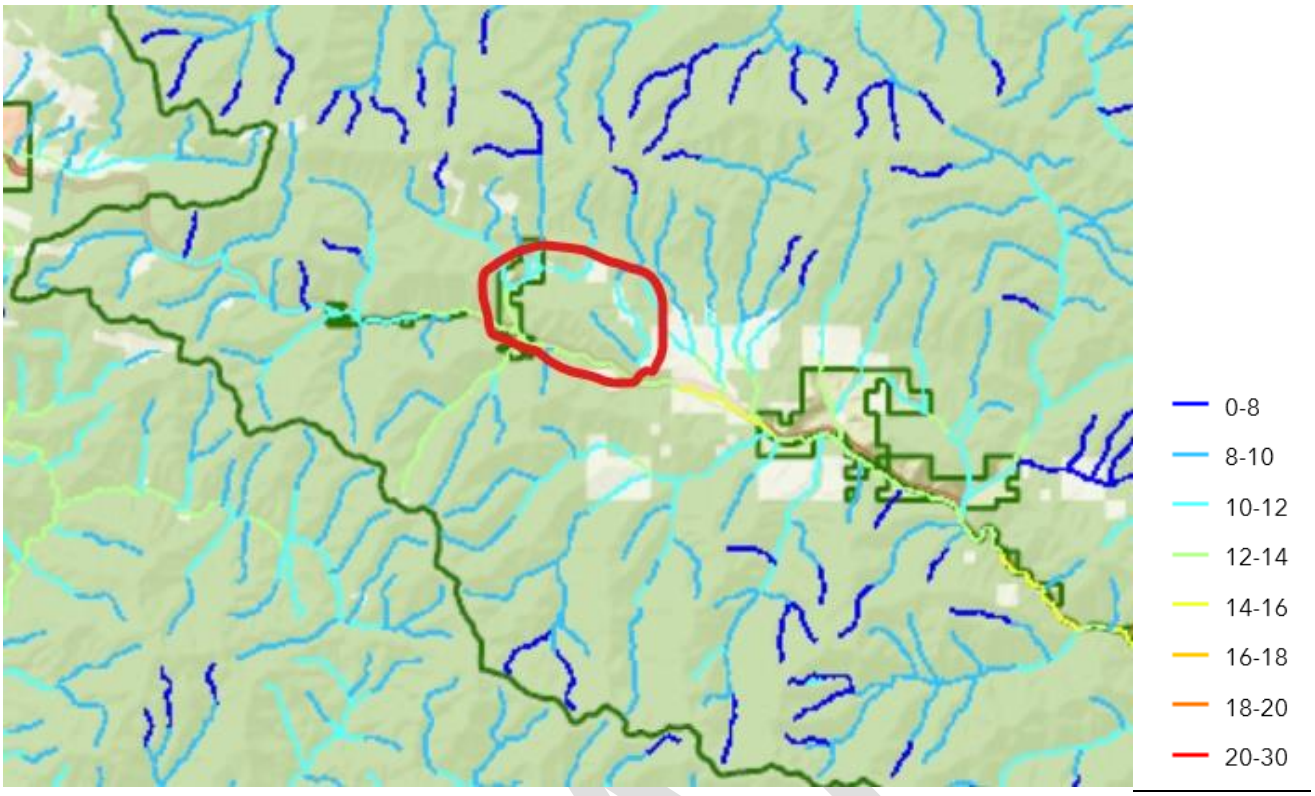

Figure 6. Existing condition (2019) of stream temperature as modeled by NorWeST. Legend values are average August temperatures in degrees Celsius. Red polygon represents project area.

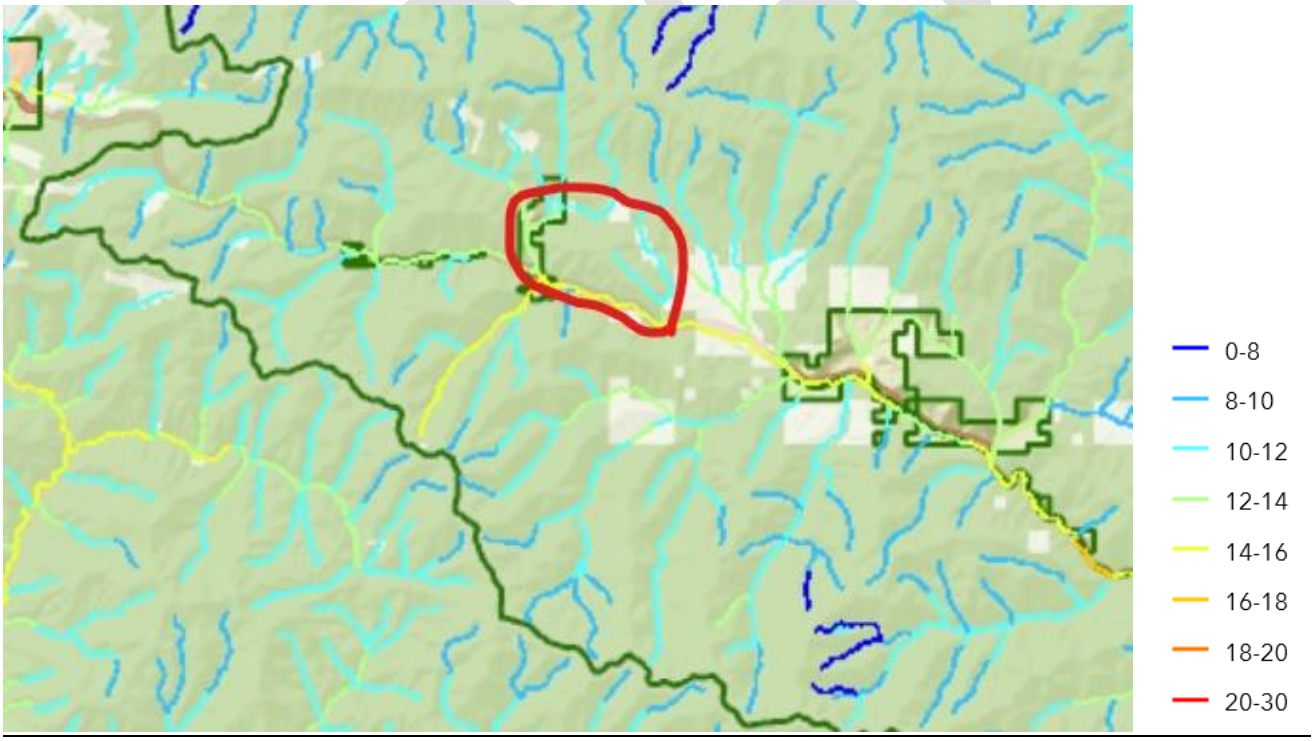

Figure 7. Modeled stream temperatures in the year 2040 as predicted by NorWeST. Legend values are average August temperatures in degrees Celsius. Red polygon represents project area.

Sediment: The existing condition of this indicator is approximated from the 'percent fines' metric of the PIBO surveys which were measured using a 1 foot square grids with 50 intersections. The grids were placed at 3 locations along each pool tail and the percentage of particles <6 mm were calculated and averaged for each pool and then across all pools within the reach. While there are no INFISH targets for sediment, percentages under 8 are generally considered typical for unmanaged watersheds on the Lolo ((Riggers et al. 1998 A., Kramer, R., and Bills, M. 1998. An Analysis of Fish Habitat and Population Conditions in Developed and Undeveloped Watersheds on the Lolo National Forest. Unpublished Forest Service Report.)); the figure below shows all streams are at or above this threshold, though EF Packer Creek is trending toward desired condition. It is worth noting that PIBO pool fine sampling methodology does not reflect sediment that has filtered down between substrates or that is suspended within the water column. Acknowledgement of sediment-producing land use that occurred within the St. Regis drainage over the past 100 years (high road densities, stream crossings, timber harvest, etc.), and the fact that PIBO methodology does not account for all sediment, further underscores that sediment within the project area are elevated above unmanaged conditions.

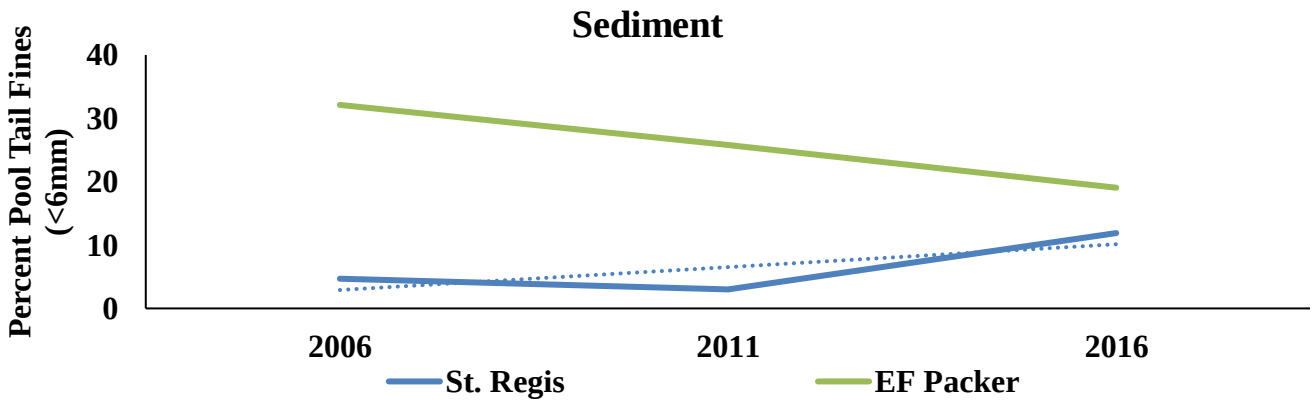

Figure 8. Percent of substrate material less than 6 mm in pool tail outs within/near the project area.

Physical Barriers: Habitat connectivity is substantially degraded from historic conditions within the upper St. Regis watershed. While barriers to aquatic species movement do occasionally occur within watersheds, they usually occur in small, steep, headwater streams (waterfalls, rock barriers, etc.). As this is not an INFISH indicator there is no identified standard apart from fewer being preferable to many. The Lolo National Forest barrier inventory currently lists (forest-wide) 28 total barriers and 50 partial (seasonal) barriers to movement based on juvenile salmonid swimming capabilities, with four flow-dependent barriers identified within the project area. Watershed practices are improving such that new stream crossings are deigned to allow aquatic organism passage and old barriers are being upgraded or removed.

Aquatic Species

This analysis will focus on bull and cutthroat trout because management and conservation efforts for these species are the focus of Forest Service and other regulatory and fish management agencies. Impacts to other fish species would be similar to those as described for bull trout and cutthroat trout given similar habitat preferences.

General fish occurrence: The Cruzane Mountain project area contains naturally reproducing native fish species including, westslope cutthroat trout (*Oncorhyncus clarki lewisi*), mountain whitefish (*Prosopium williamsoni*), and sculpin (*Cottus spp.*). Nonnative fish are prevalent throughout the area and include, rainbow trout (*O. mykiss*), brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). In addition, it is believed that cutthroat/rainbow trout hybrids are common within analysis area streams.

U.S. Forest Service Sensitive Species

The Lolo National Forest Plan (USDA Forest Service 1986) requires the National Forest to manage for sensitive species such that they do not become listed under the Endangered Species Act (ESA). Westslope cutthroat trout (see analysis figures for distribution) are a designated Forest Service, Region 1, sensitive species that indicates viability of the species is a concern; this species is well-distributed throughout project-area streams, including some populations that may be genetically unaltered (not hybridized). The Western Pearlshell Mussel (*Margaritifera falcata*) is also a sensitive species, but surveys have not documented their presence within the St. Regis River drainage. No other Region 1 sensitive aquatic species are known to occur near the project area.

Federally Listed Species

Bull trout were listed as a threatened species in 1999 and in September 2010 the U.S. Fish and Wildlife Service updated and designated critical habitat for bull trout throughout their U.S. range.

Historic distribution (from Bull Trout Conservation Strategy): *Historically, bull trout likely occupied nearly all of the third order and larger tributaries in the St. Regis River basin, and probably extended up the mainstem to within a mile or two of St. Regis Lakes. Many of these tributaries, such as Big Creek, Timber Creek, and Twelvemile Creek supported bull trout populations as recently as the late 1980's. Others, such as Deer Creek, Silver Creek, Randolph Creek, Twomile Creek, and Savanac Creek probably supported bull trout until the 1960's or 1970's when widespread timber harvest and development of the transportation system caused the overall population to decline and become restricted in range. Currently, the only streams where bull trout are commonly observed are Little Joe Creek and Ward Creek (numbers in Ward Creek are too low to count accurately).*

Project area status: Bull trout (*Salvelinus confluentus*) are not known to occur in any streams in the project vicinity, though they were present historically in the upper St. Regis River and some of its tributaries. Currently (2019), the nearest potentially occupied habitat ({United States Department of Agriculture (USDA) Forest Service. 2019. The Rangewide Bull Trout eDNA Project. United States Department of Agriculture, Rocky Mountain Research Station. Accessed online December 2019: https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=6d5597b2755c4c00a35613b7a1849760}) is located more than 10 miles downstream of the project area, in the vicinity of Ward Creek (tributary to St. Regis River). No critical habitat is located within or near the Cruzane Mountain Project; the nearest critical habitat is located within Twelvemile Creek and portions of the St. Regis River, about 9 miles downstream of the project area. The project area is located within the Middle Clark Fork core area, and St. Regis River local population unit. The importance to local bull trout populations for the two project watersheds (Packer Creek and Upper St. Regis River) is rated as "moderate" for significance to local population, and "high" for contribution of habitat in limiting population.

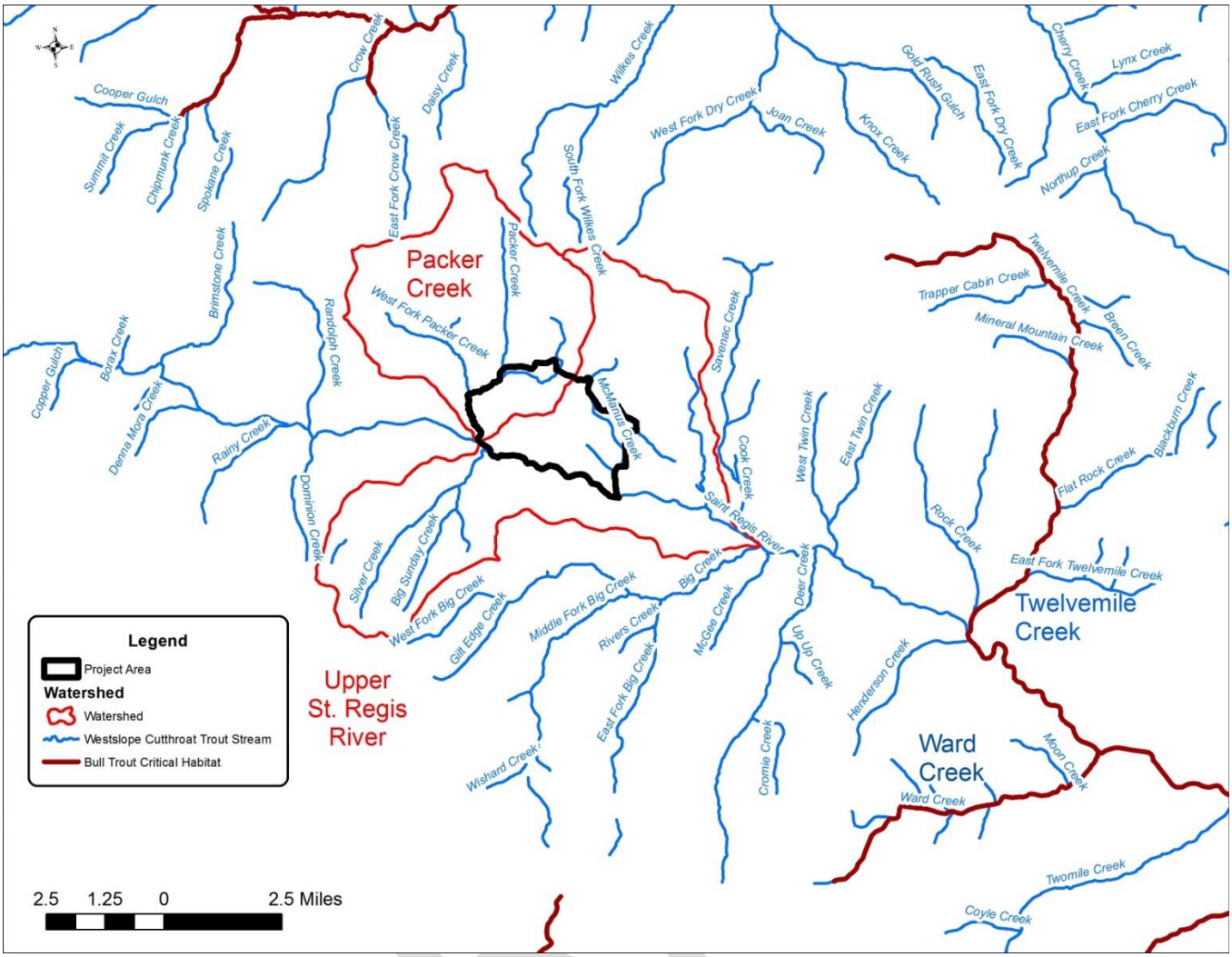

Figure 9. Project vicinity bull trout designated critical habitat.

St. Regis River

Bull trout and westslope cutthroat trout are thought to be well below historical levels in the St. Regis River. For both bull trout and westslope cutthroat trout, the migratory form is present within the drainage, although at very low levels. Migratory populations have been limited by Cabinet Gorge, Noxon and Thompson Falls Dam, the first of which was constructed in 1915. A fish ladder has been constructed on Thompson Falls Dam and was functional starting in 2011. Additionally, as part of mitigating dam impacts to bull trout, Avista captures and transports upstream migrating adults around Cabinet Gorge and Noxon dams.

Fish surveys (unpublished forest data) from 2005-2009 in the portion of the St. Regis River south of, and adjacent to, the project area documented the following species (abundance): brook trout (rare), brown trout (rare), largescale sucker (abundant), longnose sucker (abundant), mottle sculpin (unknown), mountain whitefish (rare), rainbow trout (common), and westslope cutthroat trout (common); note that hybridization between rainbow trout and cutthroat trout is common in this area, though pure populations of westslope cutthroat trout are thought to exist in some stream segments.

Packer Creek and tributaries

Survey data (unpublished forest data) from 2008-2012 recorded the presence of the following species in mainstem Packer Creek, along the west and north boundaries of the project area: brook trout, rainbow trout,

westslope cutthroat trout, and cutthroat/rainbow hybrids. Brook trout were common, while other all other species were considered rare.

In East Fork Packer Creek, near the north boundary of the project area, brook trout and westslope cutthroat trout were recorded during surveys in 2012. Both species were estimated as "abundant", and it was noted that the westslope cutthroat may be genetically unaltered due to an absence of fish stocking in this area.

McManus Creek and tributaries

Survey data from 2005 recorded the presence of brook trout (common) and westslope cutthroat trout (rare) in the mainstem McManus Creek, along the east boundary of the project area. It was noted that the westslope cutthroat may be genetically unaltered due to an absence of fish stocking in this area.

A tributary to McManus Creek, Cruzane Gulch (SE project area), was surveyed in 2009. Westslope cutthroat trout were recorded as present with rare abundance, and it was also noted that the population in this small stream may be genetically unaltered due to an absence of fish stocking in this area.

West Fork Timber Creek

A small portion of upper West Fork Timber Creek is located within the far east portion of the project area. This stream was surveyed in 2009, and westslope cutthroat trout were recorded as present with rare abundance, and it was also noted that the population may be genetically unaltered due to an absence of fish stocking in this area.

ENVIRONMENTAL CONSEQUENCES

EFFECTS UNDER NO ACTION ALTERNATIVE

The No Action Alternative would leave all identified acres in the project area watersheds untreated. This alternative would maintain the existing condition and relative impacts from the current road system and National Forest System lands. There would be no direct effects to water quality because no activities would occur. The most likely scenario is that fish habitat and populations in the project area would remain near their existing conditions.

Direct and Indirect Effects

Woody debris recruitment to stream channels in the project areas watershed would remain unchanged from current conditions. Recruitment would continue to occur from natural causes, such as bank erosion, windthrow, disease, and mass wasting. Tree diameters would slowly increase and key pieces of large woody debris would eventually be recruited to the channel. Woody debris would not be added to project area streams. Stream temperatures would remain unchanged where the canopy closure currently provides adequate stream shading; it should be noted that modeling indicates stream temperatures will still increase due to other factors. Road densities in the project watershed would remain unchanged. Road maintenance would continue on system roads, but likely at longer intervals between maintenance. Unclassified roads and specified roads that are already vegetated with brush and trees would be maintained in this condition and continue to be undisturbed. Drainage and culvert problems on closed system roads and unclassified roads would remain in undesirable condition. Surface erosion rates in the project areas would remain unchanged from current levels. Fish passage barriers and undersized culverts would still be present in the project area and be at risk of failure and subsequent downstream sedimentation.

Cumulative Effects

There would be no cumulative effects under the no action alternative, as an additive component (project) would not be present. Future conditions would continue to be affected by both natural events and multiple ongoing

actions (e.g., road maintenance, recreation, etc.). Reductions in Forest Service funding for roads, and the shifting of regional priorities to other river basins, make it unlikely that any significant road decommissioning will take place in these watersheds with Forest Service funding in the near future. Routine road maintenance will continue on open systems roads, but likely at longer intervals between maintenance activities. In summary, the project area is on a slow, trend toward recovery, but is still seeing impacts from riparian adjacent roads that has overall increased sediment loads, decreased large woody debris inputs, and decreased quality complex aquatic habitat. It is not meeting reference conditions, and given the anthropogenic influences, would not be expected to reach this condition.

EFFECTS UNDER THE PROPOSED ACTION ALTERNATIVE

General

Proposed actions of primary aquatic concern are project activities that could affect the stream habitat indicators of sediment or temperature. These two indicators are particularly important to native cold-water species, such as westslope cutthroat trout and bull trout. Effects to other indicators, such as large wood debris and channel width-to-depth ratio, are expected to be minimal or absent since the large majority of project activity would not occur within designated Riparian Habitat Conservation Areas (RHCAs); the small areas proposed for treatment within RHCAs are discussed below. The few road treatments at or near stream crossings are mostly located upstream of fish distribution, limiting any chance for disruption of fish passage.

Site visits over the past few years identified especially sensitive aquatic areas, such as: seeps, springs, and perennial stream crossings. To mitigate potential effects to specific problem areas, and stream habitat in general, Resource Protection Measures (RPMs) were designed to reduce effects from all 4 project activity categories: commercial vegetation management, non-commercial vegetation management, road management, and ecosystem management burns. In addition to project-specific protective measures, all national Best Management Practices (BMPs) would be implemented.

Season

In addition to the RPMs and BMPs, most ground-disturbing project activities are expected to occur during the dry season, which should reduce effects such as sediment mobilization. Management burns usually have a longer season, but usually pose less risk. This should reduce biological effects to aquatic species if sediment does reach a stream since spawning usually occurs in the spring for westslope cutthroat trout and fall for bull trout (likely absent from project analysis area).

Project Effects Methodology

The following analysis describes potential effects to aquatic ecosystem indicators. The level of discussion for each indicator is commensurate with the level of potential effects from proposed actions. For example, Pool Frequency, Width/Depth Ratio, Large Wood, Temperature, and Physical Barriers would be minimally affected and therefore discussed only briefly, whereas Sediment has a greater potential to be affected and will be discussed more thoroughly. This scaled approach to effects analysis is consistent with NEPA direction for environmental assessments to reduce analysis time while maintaining the ability to detect substantial impacts where they have the potential to occur (CEQ 2005) and is also consistent with recent Environmental Analysis and Decision Making (EADM) direction (final rule pending as of January 2020).

Upper St. Regis and Packer Creek Watersheds

These two sub-watersheds (HUC 12) are discussed together due to both the relatively small size of the project area, and similar type and quantity of project treatment proposed within each watershed.

Vegetation Treatment Activities

Table 2. Summary of proposed vegetation treatment activities.

Commercial Vegetation Treatment	Acres	Number of Units
Regeneration Harvest (includes shelterwood, seed tree, and clearcut with leave trees)	981.3	41
Commercial Thinning	417.4	19
Improvement Cut	12.7	1
Total	**1,411.4**	**61**
Non-Commercial Vegetation Treatment		
Fuel Break	14.7	2
Pre-commercial thinning	77.0	4
Total	**91.7**	**6**

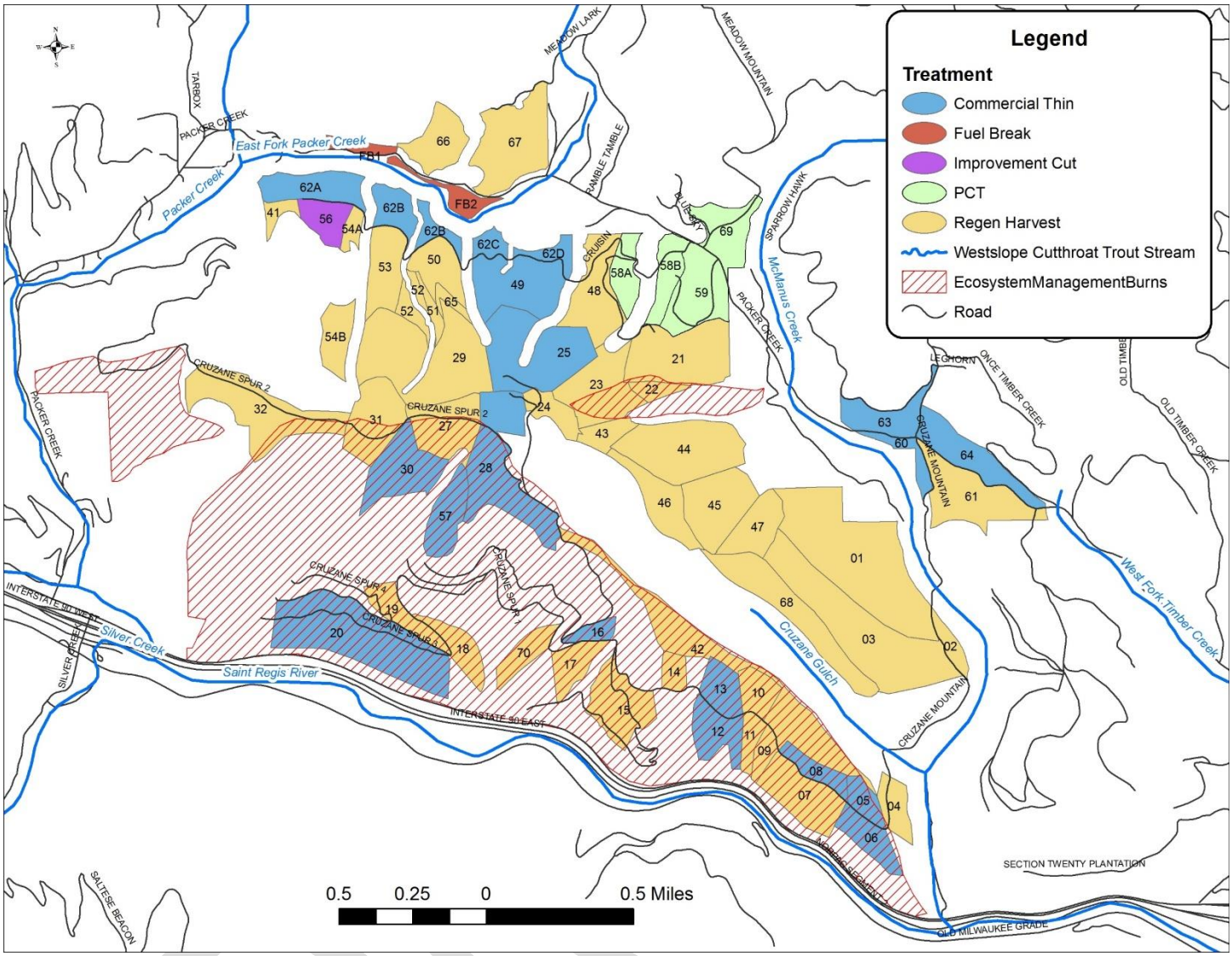

Figure 10. Cruzane Mountain Project vegetation and fire management units.

Riparian Habitat Conservation Areas (RHCAs): The vast majority of RHCAs are excluded from project actions, with less than 2% of RHCAs proposed for treatment within the project area boundary, and less than .5% within the analysis area sub-watersheds (Packer Creek and Upper St. Regis River). The majority of proposed treatment in RHCAs would be accomplished with hand methods rather than mechanized ground-disturbing equipment. The table below displays the maximum quantity of treatment that would occur in project RHCAs. However, prior to implementation all RHCA portions of applicable units will be field verified by an interdisciplinary team, including a fisheries biologist. Site-specific treatment will be designed to ensure compliance with INFISH, including maintenance or improvement of all Riparian Management Objectives (e.g., large woody debris, sediment input, stream temperature). The treatment areas within RHCAs are located adjacent to existing roads deemed important for ingress/egress of vehicular traffic.

Table 3. Riparian Habitat Conservation Area (RHCA) proposed project treatment.

Proposed Treatment Type	Project Unit Number	Acres within RHCA	Associated Stream (Sub-Watershed)
Commercial Thin (mechanical)	60	3.8	McManus Creek (Upper St. Regis River)
	63	1.6	McManus Creek (Upper St. Regis River)
Pre-Commercial Thin (non-mechanical)	69	3.7	McManus Creek (Upper St. Regis River)
Regeneration Harvest (mechanical)	66	1.0	East Fork Packer Creek (Packer Creek)
	67	4.5	East Fork Packer Creek (Packer Creek)
Fuel Break (hand, burn)	FB1	5.8	East Fork Packer Creek (Packer Creek)
	FB2	7.2	East Fork Packer Creek (Packer Creek)
		Total: 27.7	

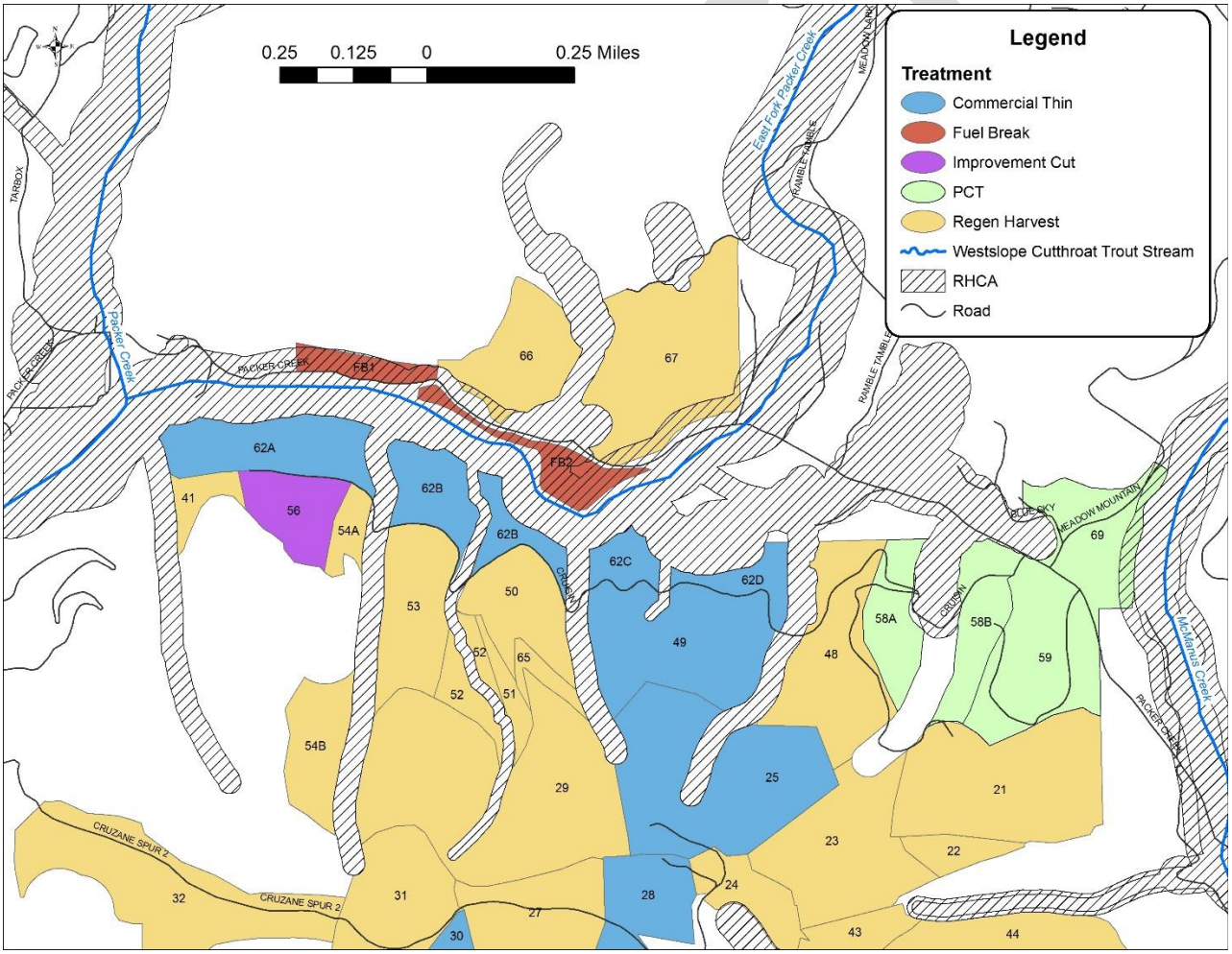

Figure 11. Proposed Riparian Habitat Conservation Area treatments, East Fork Packer Creek vicinity.

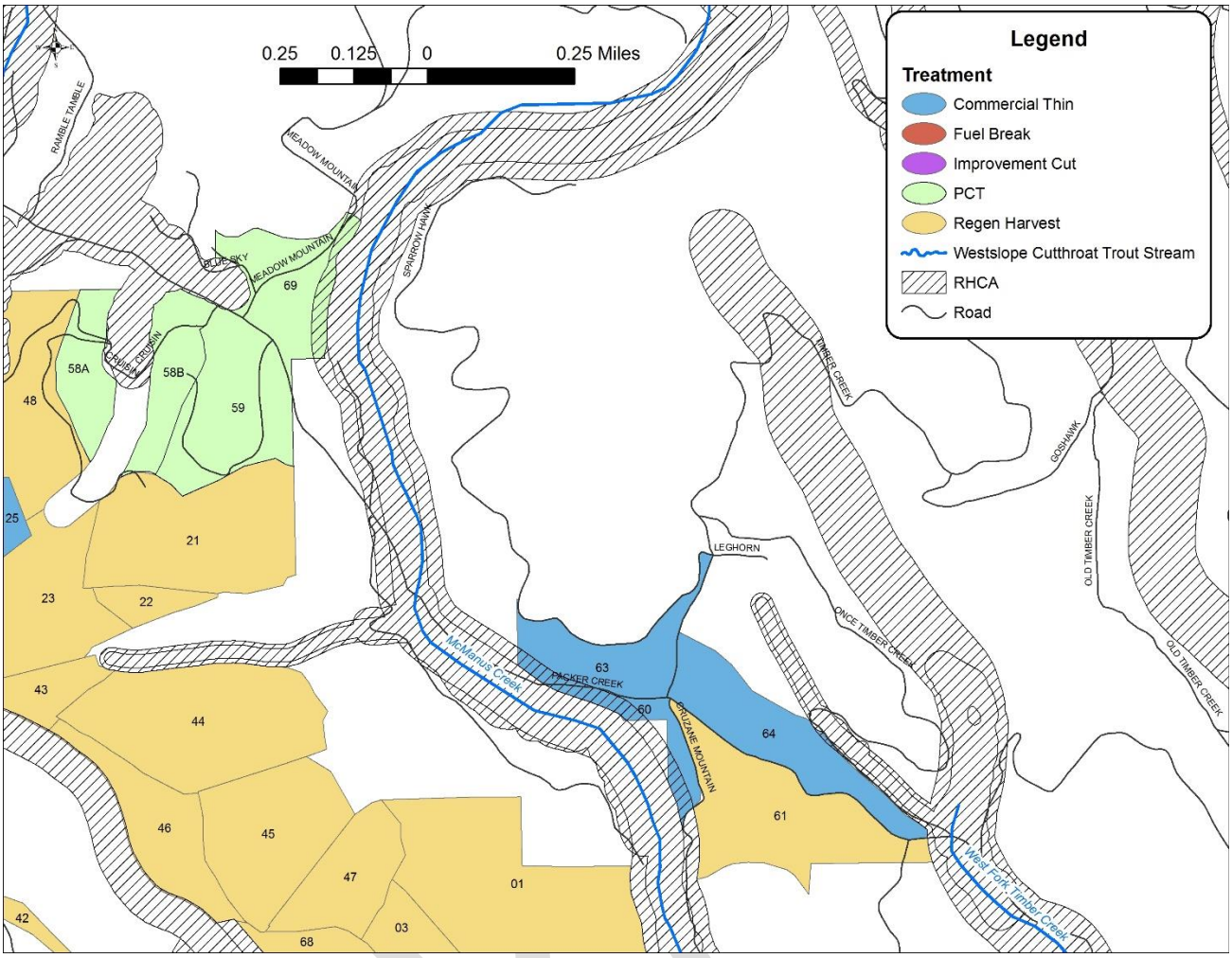

Figure 12. Proposed Riparian Habitat Conservation Area treatments, McManus Creek vicinity.

All streams within or adjacent to units would be buffered, with most perennial fish-bearing streams receiving at least a 300-foot exclusion zone (see RHCA discussion for exceptions). Therefore, in most areas, potential measurable effects from vegetation treatments to habitat indicators other than sediment and temperature (unlikely) are not expected, including: large woody debris, pool frequency, width/depth ratio, and physical barriers.

Sediment:
WEPP disturbance models (project hydrology report) were completed for a variety of vegetation treatment scenarios. In nearly all cases, no measurable sediment mobilization is expected, with only trace amounts in a minority of units. For example, the highest quantity of estimated sediment would occur from Unit 18. Modeling results show that there is a slight potential for upland erosion of 0.02 tons per acre and sediment reaching stream channels of 0.01 tons per acre in Unit 18 in certain instances, the 15 year and 30-year winter scenarios.

Due to a relative concentration of units, and some proposed treatment within RHCAs, stream reaches most likely to be subject to a small-magnitude short-term sediment increase are East Fork Packer Creek and the mainstem St. Regis River in the vicinity of the confluence of McManus Creek, and to a lesser extent (larger buffers and fewer units), lower McManus Creek. Potential sediment effects to habitat would most likely be in the form of slightly elevated turbidity, especially following rain events within a year or two of implementation.

Though unlikely, substrate embeddedness could also increase very slightly as sediment settles to the stream bottom. Pool filling is highly unlikely, since there isn't a causal mechanism for high quantities of sediment input due project RPMs and standard BMPs. The only analysis species likely present in these areas, westslope cutthroat trout, could be subject to minor short-term effects, such as behavioral changes. In addition, vegetation treatment is expected to occur after the spawning season (spring), minimizing any potential disruption to reproductive success.

Temperature:
Buffers are expected to nearly completely prevent any reduction in near-stream canopy, preventing a decrease in stream shading and associated temperature effects. A substantial increase in solar radiation would occur within some upslope areas, such as regeneration units, but this increase is unlikely to measurably affect stream temperatures at the sub-watershed scale (e.g., Packer Creek, Upper St. Regis River). Project hydrology report conclusion: The project hydrologist completed a stream temperature analysis using solar radiation and canopy cover data. The coldest surface runoff and subsurface flow originates from the lowest quadrant ranking of solar radiation values in the watershed and a canopy cover of over 40 percent. Proposed treatments will reduce canopy cover below forty percent in this lowest solar radiation quadrant of 196 acres (0.27%) of the St Regis River Watershed. Currently, 26,592 acres (36.41%) of the lowest solar radiation quadrant has a canopy cover of less than 40 percent. 13,146 (49.44%) of these acres have a canopy cover of 30 to 40% and are near the 40 percent threshold and should recover within a decade. The proposed treatments will not raise the overall stream temperature of the St Regis River watershed.

Fire Management Activities

Table 4. Project management burn activities.

Unit	Acres
LS1	40
LS2	1,041
LS3	80
Total	**1,161**

All streams within or adjacent to fire management units would be excluded from treatment (i.e., exclusion of RHCAs). Therefore, potential effects to habitat indicators other than sediment and temperature (unlikely) are not expected, including: large woody debris, pool frequency, width/depth ratio, and physical barriers.

Sediment:
Only one fish-bearing perennial stream reach has the potential to be affected by fire management units due to the substantial unit acreage upslope, the mainstem St. Regis River. All other stream drainages would receive little or no management fire activities. Potential sediment effects to habitat would most likely be in the form of slightly elevated turbidity, especially following rain events within a year or two of implementation. Though unlikely, substrate embeddedness could increase very slightly as sediment settles to the stream bottom. Pool filling is unlikely, since there isn't a causal mechanism for high quantities of sediment input; in addition, the unit boundaries are located over 300 feet from the river, providing a substantial buffer that should capture the majority of sediment. The only analysis species likely present in this portion of the St. Regis River, westslope cutthroat trout, could be subject to short-term effects, such as minor behavioral changes. Fire management

treatment normally occurs as weather and fuel conditions permit; therefore, there is a slight risk to westslope cutthroat trout during the spawning period (spring). Based on modeling results, buffers, RPMs, and BMPs, the potential effects are expected to be of very low magnitude, and short-term. In addition, this short section of the St. Regis River represents a very small portion of total occupied streams within the two analysis sub-watersheds.

WEPP disturbance models (project hydrology report) were completed for a variety of wildfire and managed fire scenarios. Model results indicated that only trace quantities of sediment mobilization could occur, limiting the chance of any measurable sediment reaching stream channels.

Additional fire-related activities, such as pile burning, would occur in some vegetation units. For the small amount of treatment proposed within RHCAs, an interdisciplinary team (including a fish biologist) would review all proposed treatment (including fire), and require treatment that would meet all Riparian Management Objectives.

Temperature:
The exclusion of fire management treatment units (LS1, LS2, LS3) within RHCAs is expected to prevent any reduction in near-stream canopy. Similarly, the small quantity of fire treatment proposed within RHCA portions of vegetation units is not expected to measurably reduce stream shading. An increase in solar radiation would occur within some upland fire management units, but temperature change would not be detectable at small watershed scales.

Road Management Activities

The project proposes a variety of road-related actions, including: road maintenance, road re-construction, temporary road construction/use (about 4.4 miles) followed by decommissioning, natural storage of existing roads, decommissioning of existing roads (about 8.1 miles), and new road construction (about 4 miles). Portions of roads proposed for decommissioning would first receive maintenance and/or reconstruction for project use, followed by post-project decommissioning.

Related to road management activities, measurable effects to habitat indicators other than sediment, temperature (unlikely) and physical barriers are not expected, including: large woody debris, pool frequency, and width/depth ratio.

Physical Barriers:

Four potential flow-dependent barriers have been identified within the project area; one on Packer Creek, one on East Fork Packer Creek, and two on McManus Creek. One of the crossings of McManus Creek, on forest system road 3831, may require a temporary bridge due to the poor condition of the culverts at this crossing. After completing management activities that rely on this road the temporary bridge and/or existing culverts would be removed and the road stream crossing would be restored by removing material, reestablishing natural flow patterns, and potentially planting/transplanting riparian plant communities. Post-project, this work is expected to result in positive benefit to the physical barrier indicator, with long-term improved fish passage. Both road maintenance/re-construction and decommissioning will require assessment of existing culverts and crossings. These areas are estimated to be upstream of fish distribution with the exception of the aforementioned McMannus Creek site (FS Road 3831); other road maintenance at or near perennial fish-bearing stream crossings is not expected to involve culvert replacement or instream channel modification. Culvert

removal and replacement will adhere to all Best Management Practices related to road management. About 22 additional crossings occur along roads proposed for maintenance, including some perennial fish-bearing streams, though culvert or in-channel work is not expected at these sites.

Table 5. Project road activities.

Road Management Activity	**Miles**
Road Reconstruction - Existing system road	6.8
Road Maintenance - Existing system road	4.5
New Construction - Add to system	4.0
Existing System Road - Natural Storage (3SN)	2.0
Road Maintenance / followed by decommissioning (3D)	1.4
Road Maintenance / followed by decommissioning (3DN)	0.7
Road Maintenance / followed by decommissioning (5D)	0.6
Total	**19.9**
Existing system roads to be closed/decommissioned	
Existing system road decommission/remove from system (3DN)	5.4
Existing system road decommission/remove from system (5D)	.1
Total	**5.5**
Temporary Roads	
Temp Road – Decommission after use **Total**	**4.4**

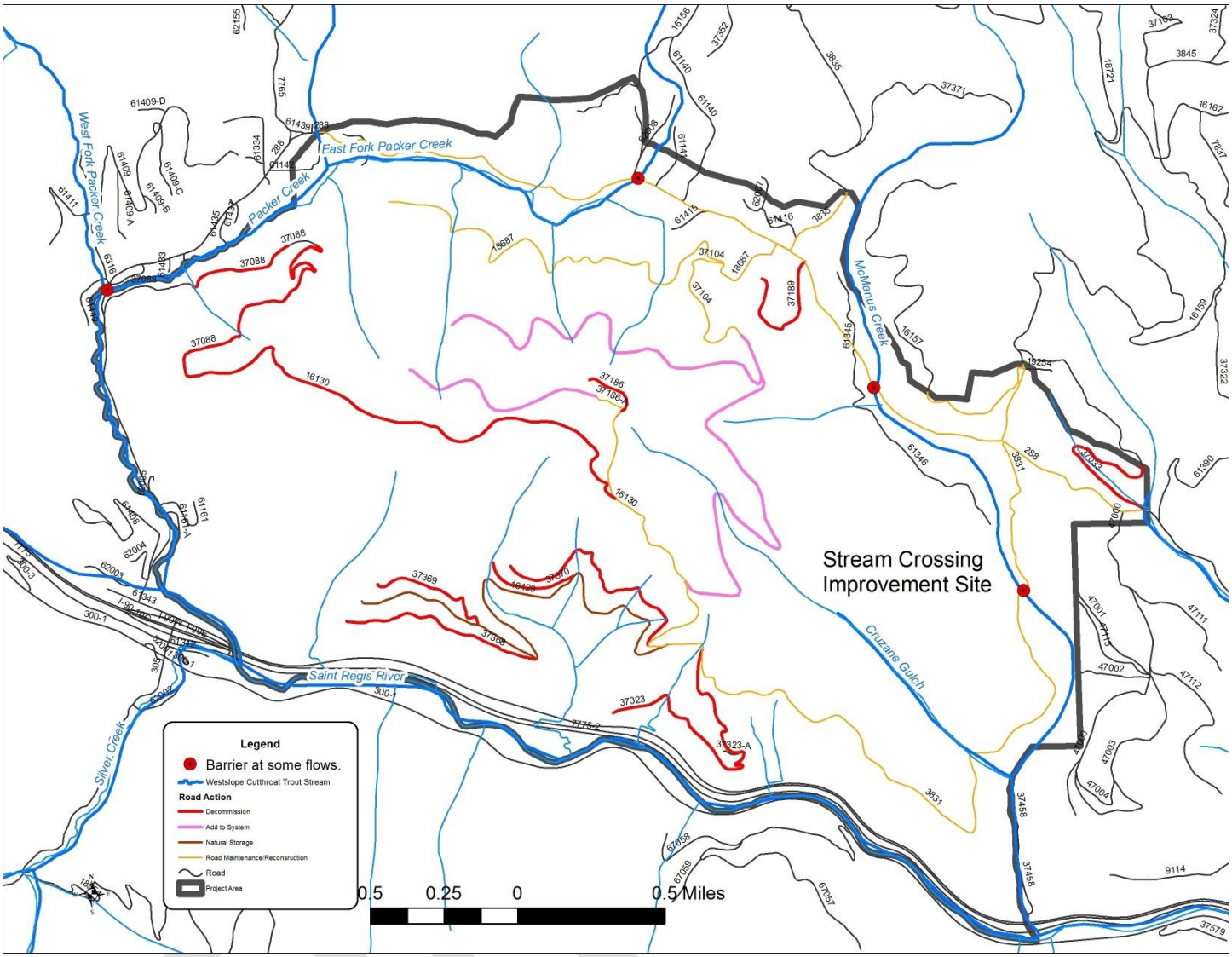

Figure 13. Cruzane Mountain Project road work and potential existing fish barriers, including stream crossing of McManus Creek. Note: temporary project roads not shown.

Sediment:

Road management activities (e.g., maintenance, construction, decommissioning) have the potential to increase stream sedimentation due to ground disturbance from heavy equipment use ({United States Department of Agriculture (USDA) Forest Service. 2015. Effects to Bull Trout and Bull Trout Critical Habitat from the Implementation of Proposed Actions Associated with Road-Related Activities that May Affect Bull Trout and Bull Trout Critical Habitat in Western Montana. Forest Service, Northern Region.}). The magnitude of this increase is dependent on quantity of disturbance and proximity to streams. The majority of road effects would likely be related to maintenance/re-construction and decommissioning, rather than new construction. The new road construction (about 4 miles) would occur at higher elevations, well upslope/upstream (upper slopes of Cruzane Mountain) of known fish distribution. New roads are subject to the most recent design which should limit long-term impacts as compared to older and/or poorly designed roads. Road re-construction and road maintenance could reduce sedimentation in some areas by repairing existing problem areas (e.g., failing bank near stream); future sedimentation would continue at a level commensurate with modern road design. Road

decommissioning (about 8.1 miles) is expected to result in a long-term reduction in fine sediment due to drainage network improvements. One crossing of McManus Creek, on forest system road 3831, may require a temporary bridge due to the poor condition of the culverts at this crossing. After completing management activities that rely on this road the temporary bridge and/or existing culverts would be removed and the road stream crossing would be restored by removing material, reestablishing natural flow patterns, and potentially planting/transplanting riparian plant communities. During and shortly after construction activities, fish may be displaced or injured, though most will likely avoid direct effects by moving up or downstream. Habitat effects, such as increased sediment input, could affect behavior in the vicinity of the crossing and downstream. Overall, long-term benefits are expected due to reduced sediment input and easier fish passage due to improved culverts and bank stabilization.

The following table displays an estimate of stream/channel crossings where road actions may occur within intermittent streams, upstream of fish distribution. About 22 additional crossings occur along roads proposed for maintenance, though culvert or in-channel work is not expected at these sites, minimizing the magnitude of sediment effects.

Table 6. Estimated number of stream/channel crossings of intermittent streams where road work could occur, including culvert removal, improvement, or replacement.

Stream Type	Road Action	Number of Culverts/Crossings
Intermittent	Decommissioning	10
	New Road Construction	5
	Road Storage	4

Sediment input from roads was modeled using GRAIP Lite (see hydrology report for details). The following values (table below) refer to the total estimated inputs at the downstream extent of the project area, near the confluence of McManus Creek with the St. Regis River. This area captures all drainages affected by project activities. A short-term (likely first year) increase of about 165 tons per year would occur due to disturbance from the combined effects of all project road actions. Post-project, a substantial long-term reduction (over 27%) is expected due to project-wide drainage improvements.

Table 7. Project road work sediment modeling results.

	Existing (tons per year)	Project (tons per year)	Post-Project (tons per year)	Percent Reduction (post vs existing)
Proposed Action	133.56	164.60	96.89	27.46%

Temperature:

Small amounts of riparian vegetation disturbance/removal would occur at some road work sites (e.g., 3831 road crossing of McManus Creek), though the quantity removed is not expected to be of sufficient magnitude to result in a measurable change to water temperature from increased solar exposure.

Road density and location:
Very little change in road density within the two analysis sub-watersheds is expected. Even though about 4 miles of new road would be constructed, decommissioning of other roads would result in a slight decrease in

total road density for each sub-watershed (table below). No new road segments would be constructed within the RHCAs of fish-bearing streams.

Table 8. Pre-project and post-project road density.

Sub-watershed	Existing Road Density (miles/square mile)	Post-Project Road Density (miles/square mile)
Packer Creek	2.53	2.52
Upper St. Regis River	3.49	3.38

CUMULATIVE EFFECTS

The temporal and spatial windows for cumulative effects analysis is the same as for direct/indirect effects. Sediment is the primary effect of concern within the project area. The majority of potential actions listed below are unlikely to deliver substantial quantities of sediment to project streams, with the exception of road-related activities (both public and private).

Existing roads and project road contribution: The past and existing road network is likely the leading source of ongoing sediment input in the analysis area. Roads that are hydrologically connected to streams are sources of persistent sediment delivery. As described in the analysis, the Cruzane Mountain Project will add sediment in the short-term, primarily due to road maintenance and construction activities; modeling indicates that very little if any sediment is expected from vegetation management units due to location (RHCA exclusion zones) and treatment types. Project-related sediment input from roads would exceed that from existing sources in the short-term, but due to drainage improvements an expected long-term decrease of about 27% is expected. Road maintenance and BMPs (ex. surface drainage, slash filters, ditch sediment basins) would continue to be implemented on existing roads and it is assumed they would be applied to the new project roads into the foreseeable future.

A Cumulative Watershed Effects (CWE) was completed for the project using Equivalent Clear-cut Acres (ECA) methodology (see project hydrology report for details). Considering project effects and combined with effects from existing sources, both project sub-watersheds are expected to remain well below (see table below) the Threshold of Concern (TOC).

Table 9. Cumulative Watershed Effects summary.

HUC12 Watershed	Total Watershed Acres	National Forest System Acres	Existing ECA Percentage Year 2020	Proposed ECA Percentage Year 2022
Upper St. Regis River	19,441	16,419	6.48	9.77
Packer Creek	11,654	10,361	3.46	6.75

Table 10. List of past/present/future actions within or near the Cruzane Mountain Project area.

	Activity & Description	Location	Active Years	Acres or Miles affected	Past	Present	Reasonably Foreseeable
Activities on all lands							
1.	Insect and disease impacts to forest health	Project area	On-going	3790 acres	X	X	X
2.	Increased risk of severe wildfire	Project area	On-going	3790 acres	X	X	X
Activities on NFS Lands							
3.	Outfitter and Guide Special Use Permits	Various locations near/within the project area	On-going	varies	X	X	X
4.	Snowmobile use during the winter	Sections of NFS Rd 3835, 3845, and 288	On-going	Approx. 4 miles	X	X	X
5.	Herbicide application for non-native invasive plants (weeds/invasive plants)	Various locations throughout the project area	2009, 2010, 2011, 2014, ongoing	66 acres in the past, variable treatment on-going based on district priorities	X	X	X
6.	Pre-commercial thinning and pruning	Various locations throughout the project area	1966, 1973-76, 2010, 2017	97 acres	X		
7.	Past commercial harvesting (includes commercial thin, liberation cut, salvage cut – intermediate, seed-tree seed cut, Shelterwood establishment cut, single tree selections cut, and stand clearcut	Various locations throughout the project area	1965, 1968, 1974-76, 1978, 1988, 1990	1,234 acres	X		
8.	Historic tree planting of off-site stock following historic fires	Various locations throughout the project area	1910, 1914, 1944	Approx. 270 acres	X		
9.	Mechanical site prep for planting or to promote natural regeneration	Various locations throughout the project area	1976, 1990	41 acres	X		X
10.	Tree planting	Various locations throughout the project area	1982, 1991	Approx. 8 acres	X		
11.	Broadcast burning, Underburning (low intensity), Burning for site preparation for planting, Pile burning	Various locations throughout the project area	1975-1999, 2015	Between 552-600 acres	X		X

12.	Wildfires (more recent)	Various locations	1980-2019	Approx. 2 acres	X		X
13.	Wildlife habitat activities	One unit within the project area	1975	6 acres	X		X
14.	NFS Road Construction/ Maintenance and associated road/stream crossings	Various locations throughout the project area	On-going	15 miles	X	X	X
15.	Road decommissioning	Segments of NFS Rds 37152, 37157, 37368-A	1990s	Approx. 2 miles (past activity – does not include proposed action)	X		
16.	Waterhole claims – Uranium mining exploration	One location within the project area	1950s	n/a	X		
Activities on adjacent lands							
17.	County Road Maintenance and associated weed spraying	Adjacent to project area along NFS road 288	On-going	Approx. 4 miles directly adjacent	X	X	X
18.	Interstate 90 (ignition sources, high use, maintenance)	Adjacent to project area on the Southeastern boundary	On-going	Approx. 3 miles directly adjacent	X	X	X
19.	Private land development and management (roads/access, infrastructure, etc)	Varies	On-going	Undetermined	X	X	X
20.	West Fork Timber Creek harvesting (State land)	Varies	On-going	Undetermined		X	X

Climate Change: Although no measurable cumulative effects to Water Temperature from project actions are expected, it is worth noting that this indicator is expected to degrade further over time. Rocky Mountain Research Station modeling strongly suggests water temperatures in the project area will warm by at least 1-2°C by the year 2040 ({United States Department of Agriculture (USDA) Forest Service. 2018. Regional Database and Modeled Stream Temperatures. United States Department of Agriculture, Rocky Mountain Research Station. Accessed online December 2018: https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=bf3ff38068964700a1f278eb9a940dce}), largely due to climate change. There are no federal actions that can be taken at the project-level scale that would reverse this warming trend.

CONCLUSION

Objective 1: Effects to Aquatic Ecosystem Indicators

The direct, indirect, and cumulative effects to Pool Frequency, Water Temperature, Large Woody Debris, and Width/Depth Ratio, and Physical Barriers would likely be negligible because the vast majority of proposed treatment is not located within RHCAs; RPMs and BMPs would be applied to those that are, including site visits by a fisheries biologist to ensure consistency with INFISH requirements. Of all the indicators, the greatest risk of causing a downward trend is to Sediment. Modeling indicates little to no sediment capable of reaching aquatic habitat would occur from vegetation treatment units. Modeling for road work related sediment indicates a measurable increase in the short-term from the combined road activities (e.g., construction, maintenance). This increased sedimentation would occur during and shortly after (within a few years) implementation; however, an approximate 27% decrease in longer term sedimentation is expected due to project road improvements (e.g., road decommissioning, improved drainage), supporting a positive trend for the Sediment indicator. Instream project road work is proposed at one fish-bearing stream, the crossing of McManus Creek by Forest Road 3831. Short-term disturbance would occur at this site, though the crossing is expected to be improved (easier passage from culvert replacement, bank stabilization), supporting maintenance or improvement of the Physical Barriers indicator.

Objective 2: Biological Evaluation

Direct effects of proposed actions to aquatic species (e.g., westslope cutthroat trout) are limited to the instream work during the bridge/culvert work on McManus Creek. These effects would be isolated to this construction site at low flows such that the number of individuals that could potentially be affected would be so low that overall population viability is not a concern.

Indirect effects to aquatic species are related to occasionally increased turbidity and substrate embeddedness. The duration and intensity of effects are low enough that nearly all effects to aquatic species would likely be sub-lethal.

Cumulative effects to aquatic species are likewise primarily related to sediment delivery and are expected to be low enough that overall effects would not threaten species viability. This finding is based on population viability principles outlined in *Consideration of Extinction Risks for Salmonids* (Rieman et al. 1993), where four population characteristics and two regional population characteristics were assessed for westslope cutthroat trout and bull trout. Risk levels for each population characteristic were assigned using professional judgement by Lolo fisheries biologists as suggested by Rieman et al. (1993; table below). A low risk of extinction means that a population has a high probability (>95%) of persisting through the period relevant to forest management (100 to 200 years) given existing or improving conditions, while populations with high risk of extinction have less than 50% probability of persisting through the same time period (Rieman et al. 1993).

Based on the preceding analysis, the determination for westslope cutthroat trout is: **May Impact Westslope Cutthroat Trout Individuals, but is Not Likely to Result in a Trend Toward Federal Listing or Reduced Viability for the Species or Population Within the Planning Area**. Due to species absence from the project area, the determination for all other Forest Service sensitive aquatic species (e.g., western pearlshell mussel) is **No Effect**.

It is important to note that the extinction risk assessments in the table below are based on existing conditions based on cumulative effects, to include Clark Fork dams, non-native species introductions, federal and non-federal land use practices, and climate change. Based on the effects analyses in this report, Cruzane Mountain proposed actions would not be expected to increase the risk of extinction for either westslope cutthroat trout or bull trout.

Table 11. Westslope cutthroat trout and bull trout population risk assessments. Local Population refers to the project watersheds and Regional Population is the Middle Clark Fork core area. Descriptions of Population Characteristics and Risk Level criteria can be found in Rieman et al. 1993.

Population Scale	Population Characteristics	Risk Level	
		Westslope Cutthroat Trout	Bull Trout
Local	Temporal Variability in Recruitment/Survival	Low	High
	Population Size	Low	High
	Growth, Survival	Low	High
	Isolation	Low	High
Regional	Replication	Low	Moderate
	Synchrony	Low	Moderate

Objective 3: Biological Assessment

Findings of this report indicate minimal or no sediment effects from project vegetation units, and a measurable short-term increase in sediment from project road work activities, following by a sediment decrease in the longer term as compared to existing condition. No measurable effects to temperature or other habitat indicators are expected at the sub-watershed (HUC 12) scale. While it is unlikely, there is insufficient data to completely preclude the possibility bull trout may occasionally occupy the St. Regis River in the project area vicinity; this report assumed the nearest likely occupied habitat is located more than 9 miles downstream, in Ward Creek or Twelvemile Creek (designated critical habitat). If bull trout were to migrate to project vicinity, they could conceivable be subject to effects related to elevated turbidity, such as behavioral changes (Muck 2010). This slight potential for overlap between project effects and bull trout leads to an Endangered Species Act determination of **May Affect, Not Likely to Adversely Affect** for bull trout. The determination for bull trout critical habitat is **No Effect** as no project effects are anticipated to reach designated habitat at the confluence of Twelvemile Creek. A biological assessment will be prepared to disclose potential bull trout effects to the Fish and Wildlife Service according to Section 7 consultation requirements.

The project is expected to be compliant with all INFISH requirements, including designation of Riparian Habitat Conservation Areas (RHCAs) and Standards and Guidelines for any activities located within RHCAs. For example, perennial fish-bearing streams receive a width of 300 feet on each side of stream (600 feet total), or two site potential tree heights, whichever is greater. The small amount of treatment proposed within RHCAs represents only a small fraction (about .5%) of total analysis area RHCAs; these specific areas will be field reviewed by forest specialists, including a fisheries biologist; therefore, compliance with all Riparian Management Objectives is expected.

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